

FORM PTO-1390 (REV. 11-2000)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371			0933-0177P
U.S. APPLICATION NO. (If known, see 37 CFR 1.5)			09/080196
INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED	
PCT/FI00/00544	June 16, 2000	July 7, 1999	
TITLE OF INVENTION SUCTION DEVICE			
APPLICANT(S) FOR DO/EO/US Osmo SUOVANIEMI, Erkki KASKI, Ari LUUKKANEN, Erkki VESANEN			
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:			
<p>1. <input checked="" type="checkbox"/> This is a <b>FIRST</b> submission of items concerning a filing under 35 U.S.C. 371.</p> <p>2. <input type="checkbox"/> This is a <b>SECOND</b> or <b>SUBSEQUENT</b> submission of items concerning a filing under 35 U.S.C. 371.</p> <p>3. <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39 (1).</p> <p>4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31).</p> <p>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))</p> <p>a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). WO 01/03835</p> <p>b. <input checked="" type="checkbox"/> has been transmitted by the International Bureau.</p> <p>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</p> <p>6. <input type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).</p> <p>a. <input type="checkbox"/> is transmitted herewith.</p> <p>b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4)</p> <p>7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).</p> <p>a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau).</p> <p>b. <input type="checkbox"/> have been transmitted by the International Bureau.</p> <p>c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</p> <p>d. <input checked="" type="checkbox"/> have not been made and will not be made.</p> <p>8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</p> <p>9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</p> <p>10. <input checked="" type="checkbox"/> An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</p>			
Items 11. to 20. below concern document(s) or information included:			
<p>11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98, Form PTO-1449(s), and International Search Report (PCT/ISA/210) with 5 cited document(s).</p> <p>12. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</p> <p>13. <input checked="" type="checkbox"/> A <b>FIRST</b> preliminary amendment.</p> <p>14. <input type="checkbox"/> A <b>SECOND</b> or <b>SUBSEQUENT</b> preliminary amendment.</p> <p>15. <input type="checkbox"/> A substitute specification.</p> <p>16. <input type="checkbox"/> A change of power of attorney and/or address letter.</p> <p>17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821-1.825.</p> <p>18. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4).</p> <p>19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).</p> <p>20. <input checked="" type="checkbox"/> Other items or information: PCT/IB/308 PCT/IB/304 PCT/IPEA/409</p>			

U.S. APPLICATION NO (if known, see 37 CFR 1.5) <b>09/980196</b>		INTERNATIONAL APPLICATION NO PCT/FI00/00544		ATTORNEY'S DOCKET NUMBER 0933-0177P	
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21. <input checked="" type="checkbox"/> The following fees are submitted: <b>BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5):</b> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO. .... <b>\$1,040.00</b>  International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... <b>\$890.00</b>  International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO. .... <b>\$740.00</b>  International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... <b>\$710.00</b>  International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4). .... <b>\$100.00</b> <b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>				<b>CALCULATIONS      PTO USE ONLY</b>	
				\$	1,040.00
Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	16 - 20 =	0	X \$18.00	\$	
Independent Claims	3 - 3 =	0	X \$84.00	\$	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)				+ \$280.00	\$
<b>TOTAL OF ABOVE CALCULATIONS =</b>				\$	1,040.00
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$	
<b>SUBTOTAL =</b>				\$	1,040.00
Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
<b>TOTAL NATIONAL FEE =</b>				\$	1,040.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). <b>\$40.00</b> per property				\$	40.00
<b>TOTAL FEES ENCLOSED =</b>				\$	1,080.00
				Amount to be:	\$
				refunded	
				charged	\$

a. ☒ A check in the amount of \$ **1,080.00** to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account. No. \_\_\_\_\_ in the amount of \$ \_\_\_\_\_ to cover the above fees.  
 A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any  
 overpayment to Deposit Account No. 02-2448.

**NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.**

Send all correspondence to:  
**Birch, Stewart, Kolasch & Birch, LLP** or Customer No. 2292  
**P.O. Box 747**  
**Falls Church, VA 22040-0747**  
**(703) 205-8000**

Date: November 30, 2001

By: Joe McKinney Murcy  
 Joe McKinney Murcy, #32,384

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: Osmo SUOVANIEMI et al.  
Int'l. Appl. No.: PCT/FI00/00544  
Appl. No.: NEW  
Filed: November 30, 2001  
For: SUCTION DEVICE

PRELIMINARY AMENDMENT

**BOX PATENT APPLICATION**

Assistant Commissioner for Patents  
Washington, DC 20231

November 30, 2001

Sir:

The following Preliminary Amendments and Remarks are respectfully submitted in connection with the above-identified application.

AMENDMENTS

IN THE ABSTRACT OF THE DISCLOSURE:

Please replace the Abstract of the Disclosure with the rewritten Abstract of the Disclosure located below:

**--Abstract of the Disclosure**

A method for detaching a barrier means adapted to the end part of the suction device for closing an opening in the end part by the movement of a plunger intended for changing the volume of a cylindrical space provided in the end part whereby the barrier means is removed by bringing means for limiting the movement of the plunger in the cylindrical space, e.g. means intended for

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removing the disposable tip, in such a position that the plunger can be brought into contact with the barrier means for detaching the barrier means from the end part of the suction device.--

IN THE SPECIFICATION:

Please insert the following paragraph and headings before the paragraph beginning on page 1, line 3:

--This application is the national phase under 35 U.S.C. § 371 of PCT International Application No. PCT/FI00/00544 which has an International filing date of June 16, 2000, which designated the United States of America and was published in English.

**BACKGROUND OF THE INVENTION**

**Field of the Invention--**

Please insert the following heading before the paragraph beginning on page 1, line 13:

**--Description of the Prior Art--**

Please insert the following heading before the paragraph beginning on page 1, line 32:

**--Summary of the Invention--**

Please insert the following paragraph and heading after the paragraph ending on page 4, line 5:

--Further scope of the applicability of the present invention will become apparent from the detailed description given

hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

**Brief Description of the Drawings--**

Please replace the paragraph beginning on page 4, line 7, with the following rewritten paragraph:

--The invention is described in the following in detail with embodiments by referring to the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention, and in which--

Please add the following heading before the paragraph beginning on page 4, line 14:

**--Detailed Description of the Preferred Embodiments--**

In the Claims:

Please amend the claims as follows:

1.(Amended) A method in a suction device, such as a mechanical pipette, comprising a body and an associated end part with an open distal end directed away from the body for removably attaching a disposable tip enclosing a sample space for receiving a liquid sample, the end part of the suction device enclosing a

cylinder space containing a reciprocatingly movable means, a plunger, for changing the volume of the cylindrical space for receiving a sample to the tip and removing it therefrom, and to which end part of the suction device is adapted a barrier means to close an opening in the end part, wherein the barrier means adapted to the end part of the suction device are detached by moving the plunger first in the direction of the opening in the end part of the suction device into contact with the barrier means and then by moving the plunger in the direction of the said opening for removing the barrier means from the end part of the suction device.

2. (Amended) The method according to claim 1, wherein the suction device is provided with means which limit the movement of the plunger in the cylindrical space and which can be brought to at least one such position in which the plunger can be brought into contact with the barrier means adapted to the end part of the suction device for detaching the barrier means from the end part of the suction device.

3. (Amended) The method according to claim 1, wherein the means for limiting the movement of the plunger comprise of means intended for detaching the removably to the end part of the suction device attached disposable tip which are positioned in such a position that the plunger can be brought into contact with the barrier means adapted to the end part of the suction device.

4. (Amended) A method in the suction device, such as a mechanical pipette, comprising a body and an associated end part with an open distal end directed away from the body for removably attaching a disposable tip enclosing a sample space for receiving a liquid sample, the end part of the suction device enclosing a cylinder space containing a reciprocatingly movable means, a plunger, for changing the volume of the cylindrical space for receiving a sample to the tip and removing it therefrom, and to which end part of the suction device is adapted a barrier means to close an opening in the end part, wherein the barrier means adapted to the end part of the suction device are detached by moving the plunger first in the direction of the opening in the end part of the suction device in that way that a telescopic extension of the plunger comes into contact with the barrier means and then by moving the plunger in the direction of the said opening for removing the barrier means from the end part of the suction device.

5. (Amended) The method according to claim 4, wherein the suction device is provided with means which limit the movement of the plunger in the cylindrical space and which means can be brought to at least one such position in which the telescopic extension of the plunger can be brought into contact with the barrier means adapted to the end part of the suction device for

removing the barrier means from the end part of the suction device.

6. (Amended) The method according to claim 5, wherein the means for limiting the movement of the plunger comprise means intended for removing the removably to the end part of the suction device attached disposable tip which are positioned in such a position that the telescopic extension of the plunger can be brought into contact with the barrier means adapted to the end part of the suction device.

7. (Amended) The method according to one of claims 1-6, wherein the suction device is multichannel.

8. (Amended) A suction device comprising a body and an associated end part with an open distal end directed away from the body for removably attaching a disposable tip enclosing a sample space for receiving a liquid sample, the end part of the suction device enclosing a cylinder space containing a reciprocatingly movable means, a plunger, for changing the volume of the cylindrical space for receiving a sample to the tip and removing it therefrom, and means for detaching the disposable tip removably attached to the end part, wherein the suction device is provided with means which limit the movement of the plunger in the cylindrical space and which can be brought to at least one position in which the plunger can be brought into contact with



the barrier means adapted to the end part of the suction device for detaching the barrier means from the end part of the suction device.

9. (Amended) The suction device according to claim 8, wherein the means in the suction device for detaching the disposable tip from the end part of the suction device can be brought to a position in which they limit the movement of the plunger in the cylindrical space.

10. (Amended) The suction device according to claim 8 or 9, wherein the suction device is multichannel.

REMARKS

The Abstract, specification, and claim 1-10 have been amended. Reconsideration of the application, as amended, is respectfully requested.

The specification has been amended to provide a cross-reference to the previously filed International Application, and the add headings to place the specification in better form for U.S. practice. The Abstract and claims have been amended to remove reference numerals and also to place them in better form for U.S. practice.

Entry of the above amendments is earnestly solicited. An early and favorable first action on the merits is earnestly solicited.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By Joe McKinney Muncy  
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KM/asc  
0933-0177P

Attachment: VERSION WITH MARKINGS TO SHOW CHANGES MADE

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE ABSTRACT OF THE DISCLOSURE:

The Abstract of the Disclosure has been amended as follows:

**--Abstract of the Disclosure[:]**

[The object of the invention is a] A method for detaching a barrier means [(12)] adapted to the end part [(2)] of the suction device for closing an opening [(5)] in the end part [(2)] by the movement of a plunger [(6)] intended for changing the volume of a cylindrical space [(4)] provided in the end part [(2)] whereby the barrier means [(12)] is removed by bringing means [(8, 9)] for limiting the movement of the plunger [(6)] in the cylindrical space [(4)], e.g. means [(10)] intended for removing the disposable tip [(3)], in such a position that the plunger [(6)] can be brought into contact with the barrier means [(12)] for detaching the barrier means [(12)] from the end part [(2)] of the suction device.--

IN THE SPECIFICATION:

A paragraph and headings have been added before the paragraph beginning on page 1, line 3.

A heading has been added before the paragraph beginning on page 1, line 13.

A heading has been added before the paragraph beginning on page 1, line 32.

A paragraph and heading have been added after the paragraph ending on page 4, line 5.

The paragraph beginning on page 4, line 7, has been amended as follows:

--The invention is described in the following in detail with embodiments by referring to the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention, and in which--

A heading has been added before the paragraph beginning on page 4, line 14.

IN THE CLAIMS:

The claims have been amended as follows:

1.(Amended) A method in a suction device, such as a mechanical pipette, comprising a body [(1)] and an associated end part [(2)] with an open distal end directed away from the body for removably attaching a disposable tip [(3)] enclosing a sample space [(11)] for receiving a liquid sample, the end part [(2)] of the suction device enclosing a cylinder space [(4)] containing a reciprocatingly movable means [(6)], a plunger, for changing the volume of the cylindrical space [(4)] for receiving a sample to the tip [(3)] and removing it therefrom, and to which end part [(2)] of the suction device is adapted a barrier means [(12)] to close an opening [(5)] in the end part [(2)], [**characterized** in that] wherein the barrier means [(12)] adapted to the end part [(2)] of the suction device are detached by moving the plunger [(6)] first in the direction of the opening [(5)] in the end part [(2)] of the suction device into contact with the barrier means [(12)] and then by moving the plunger [(6)] in the direction of the said opening [(5)] for removing the barrier means [(12)] from the end part [(2)] of the suction device.

2. (Amended) [A] The method according to claim 1, [characterized in that] wherein the suction device is provided with means [(8,9)] which limit the movement of the plunger [(6)] in the cylindrical space [(4)] and which can be brought to at least one such position in which the plunger [(6)] can be brought into contact with the barrier means [(12)] adapted to the end part [(2)] of the suction device for detaching the barrier means [(12)] from the end part [(2)] of the suction device.

3. (Amended) [A] The method according to claim 1, [characterized in that] wherein the means [(8,9)] for limiting the movement of the plunger [(6)] comprise of means [(10)] intended for detaching the removably to the end part [(2)] of the suction device attached disposable tip [(3)] which are positioned in such a position that the plunger [(6)] can be brought into contact with the barrier means [(12)] adapted to the end part [(2)] of the suction device.

4. (Amended) A method in the suction device, such as a mechanical pipette, comprising a body [(1)] and an associated end part [(2)] with an open distal end directed away from the body for removably attaching a disposable tip [(3)] enclosing a sample space [(11)] for receiving a liquid sample, the end part [(2)] of the suction device enclosing a cylinder space [(4)] containing a reciprocatingly movable means [(6)], a plunger, for changing the volume of the cylindrical space [(4)] for receiving a sample to the tip [(3)] and removing it therefrom, and to which end part [(2)] of the suction device is adapted a barrier means [(12)] to close an opening [(5)] in the end part [(2)], [characterized in that] wherein the barrier means [(12)] adapted to the end part [(2)] of the suction device are detached by moving the plunger [(6)] first in the direction of the opening [(5)] in the end part [(2)] of the suction device in that way that a telescopic extension of the plunger [(6)] comes into contact with the

barrier means [(12)] and then by moving the plunger [(6)] in the direction of the said opening [(5)] for removing the barrier means [(12)] from the end part [(2)] of the suction device.

5. (Amended) [A] The method according to claim 4, [**characterized** in that] wherein the suction device is provided with means [(8, 9)] which limit the movement of the plunger [(6)] in the cylindrical space [(4)] and which means can be brought to at least one such position in which the telescopic extension of the plunger [(6)] can be brought into contact with the barrier means [(12)] adapted to the end part [(2)] of the suction device for removing the barrier means [(12)] from the end part [(2)] of the suction device.

6. (Amended) [A] The method according to claim 5, [**characterized** in that] wherein the means [(8, 9)] for limiting the movement of the plunger [(6)] comprise means [(10)] intended for removing the removably to the end part [(2)] of the suction device attached disposable tip [(3)] which are positioned in such a position that the telescopic extension of the plunger [(6)] can be brought into contact with the barrier means [(12)] adapted to the end part [(2)] of the suction device.

7. (Amended) [A] The method according to one of claims 1-6, [**characterized** in that] wherein the suction device is multichannel.

8. (Amended) A suction device comprising a body [(1)] and an associated end part [(2)] with an open distal end directed away from the body for removably attaching a disposable tip [(3)] enclosing a sample space [(11)] for receiving a liquid sample, the end part [(2)] of the suction device enclosing a cylinder space [(4)] containing a reciprocatingly movable means [(6)], a plunger, for changing the volume of the cylindrical space [(4)]

for receiving a sample to the tip [(3)] and removing it therefrom, and means [(10)] for detaching the disposable tip [(3)] removably attached to the end part [(2)], [**characterized** in that] wherein the suction device is provided with means [(8, 9)] which limit the movement of the plunger [(6)] in the cylindrical space [(4)] and which can be brought to at least one position in which the plunger [(6)] can be brought into contact with the barrier means [(12)] adapted to the end part [(2)] of the suction device for detaching the barrier means [(12)] from the end part [(2)] of the suction device.

9. (Amended) [A] The suction device according to claim 8, [**characterized** in that] wherein the means [(10)] in the suction device for detaching the disposable tip [(3)] from the end part [(2)] of the suction device can be brought to a position in which they limit the movement of the plunger [(6)] in the cylindrical space [(4)].

10. (Amended) [A] The suction device according to claim 8 or 9, [**characterized** in that] wherein the suction device is multichannel.

Suction device

The object of this invention is a method to be used in a suction device, such as a mechanical pipette, comprising a body and an associated end part with an open  
5 distal end directed away from the body for removably attaching a disposable tip enclosing a sample space for receiving a liquid sample, the end part of the suction device enclosing a cylinder space containing a reciprocatingly movable means for changing the volume of the cylindrical space for receiving a sample to the tip and removing it therefrom, for removing a barrier means adapted to the end part of the  
10 suction device and closing the opening in the end part. The object of the invention is also a suction device for employing the method.

In electronic as well as in mechanical suction devices, pipettes, barrier means are used in their end part to prevent liquids or reagents to be dispensed or molecules  
15 vaporizing from them from entering the inner parts of the pipette. These liquids or vaporized molecules in entering the inner parts of the pipette can contaminate the said inner parts and further in moving over from one sample to another can cause the contamination of the other sample. Samples and/or reagents can be valuable and in any case in the laboratory work cannot be accepted anything that  
20 deteriorates the reliability of the operation.

The barrier means are usually adapted to cover the opening in the end part of the suction device forming a gaseous passage between the cylindrical space in the end  
25 part of the suction device and a sample space of the disposable tip to be attached removably to the end part of the suction device. The barrier means attach to the end part of the suction device, to the opening therein and/or to the cylindrical space so that they can easily be removed when desired.

The removal of the barrier means manually exposes the user of the suction device  
30 to samples or reagents which may be poisonous or dangerous.

To solve this problem, in the method according to the invention the barrier means are removed with the movement of the plunger, which is reciprocatingly movable



in the cylindrical space of the suction device and which is intended for changing the volume of the cylindrical space. The said plunger is moved in the cylindrical space for taking samples or reagents into the disposable tip attached to the suction device, for dispensing and/or for removing them from the said tip. In these  
5 operations the plunger is moved between its two extreme positions, of which the first one with the plunger drawn into the cylinder corresponds the maximal suction, and of which the second one with the plunger coming to the vicinity of the opening in the end part of the suction device corresponds to the removal of the sample. For moving the plunger, the body of the suction device comprises  
10 operating means in association with the plunger. The suction device has preferably also means in association with the operating means for limiting the movement of the plunger in the cylindrical space.

The disposable tip attached to the suction device, onto the end of its end part, is  
15 removed in some suction devices with a sleeve movable on the end of the end part. The moving of the sleeve can take place as a separate operation directly manually or with separate means such as levers or bars. The sleeve can in some cases also be moved with means in association with the operating means of the said plunger or the means associated with the moving of the sleeve can be made  
20 in association with the operating means of the plunger or with means in association with it for removing the disposable tip by means of the sleeve.

The barrier means in the suction devices are removed from the suction device after the removal of the disposable tip when necessary, the barrier means are generally  
25 not always removed in connection of the removal of the disposable tip.

It is characteristic for the method according to the invention that the barrier means adapted to the end part of the suction device are removed by moving the plunger first in the direction of the opening in the end part of the suction device in contact  
30 with the barrier means and then by moving the plunger in the direction of the said opening for removing the barrier means from the end part of the suction device.

To prevent the unintentional or not-intended removal of the barrier means, the means for limiting the movement of the plunger in the cylindrical space are brought in one preferred embodiment of the method according to the invention in such a position in which the plunger cannot be moved into contact with the barrier means. When the barrier means are desired to be removed, the means limiting the movement of the plunger are brought in such a position that the plunger can be moved in contact with the barrier means and that in moving the plunger further in the direction of the opening in the end part, the movement of the plunger removes the barrier means from the end part of the suction device.

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It is also characterizing to the suction device according to the invention that the suction device is provided with means which limit the movement of the plunger in the cylindrical space and which can be brought into at least one position in which the plunger can be brought in contact with the barrier means adapted to the end part of the suction device for removing the barrier means from the end part of the suction device.

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In a preferred embodiment of the invention as means which limit the movement of the plunger and prevent the moving of the plunger into contact with the barrier means are used preferably means for removing the disposable tip such as e.g. the sleeve movable on the end of the end part and/or means associated with it, which means can be positioned with regard to the plunger and/or its operating means and/or means associated with them in a plurality of positions for limiting the movement of the plunger. When the user wants to remove the barrier means, the user selects such a position among the mutual positions between the plunger, its operating means and/or means associated with them, and the sleeve and/or means associated with it, in which the plunger can be moved into contact with the barrier means and in which position the plunger can further be moved for removing the barrier means.

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In a preferred embodiment of the invention, the plunger is never brought directly into contact with the barrier means, but the plunger is provided with means, which

in moving the plunger towards the opening in the end part of the suction device, can be brought into contact with the barrier means and which in continuing the movement of the plunger bring about the removal of the barrier means from the end part of the suction device. These means are in a preferred embodiment of the invention a telescopic extension of the plunger.

The invention is described in the following in detail with embodiments by referring to the accompanying drawings in which

figure 1 presents a longitudinal cross-section of the suction device.

In the figures like reference numbers are used for like parts.

In figure 1 the body of the suction device is referenced with reference number 1 and the end part removably attached thereon with reference number 2. The end part 2 encloses a cylindrical space 4 having a reciprocatingly movable means 6, a plunger, for changing the volume of the cylindrical space 4. For moving the plunger 6 in the cylindrical space the suction device is provided with operating means 7 in association with the plunger 6. A disposable tip 3 provided with a sample space 11 for liquid samples can be attached to the end part 2 of the suction device. The end of the end part 2 is provided with an opening 5 forming a gaseous passage between the cylindrical space 4 and the sample space 11 of the disposable tip 3. A barrier means 12, permeable to gases but impermeable to liquids, is adapted to cover the opening 5 in the end of the end part 2, the barrier means preventing the entry of the samples or reagents or the molecules possibly vaporizing from them into the inner parts of the suction device.

In figure 1 means 8 are shown which together with the means 9 associated with the operating means 7 limit the movement of the plunger 6 in the cylindrical space 4. The means 8 can preferably be positioned to limit the movement of the plunger 6 in the cylindrical space or they can be positioned in such a position with regard

to the plunger 6, its operating means 7, or means 9 associated with them, that they do not limit the movement of the plunger 6.

In figure 1 are also shown schematically means 10 for removal of the disposable tip 3 from the end part 2 by using the movement of the plunger 6. When the plunger 6 is moved by the operating means 7, the means 9 associated with the operating means 7 can come in contact with the tip removal means 10 and in further moving the plunger 6 in the direction of the opening 5 in the end part 2 of the suction device, the means 10 come into contact with the disposable tip 3.

When the movement of the plunger 6 further continues in the direction of the opening 5 of the end part 2, the means 10 bring about with their movement the removal of the disposable tip 3 from the end part 2 of the suction device. In a preferred embodiment of the invention, the plunger 6 can be moved towards the opening 5 in the end part 2 of the suction device still after the detachment of the disposable tip 3.

The means 10 have in an embodiment of the invention preferably also another position, in which the means 10 can come into contact with the plunger 6 or with means associated with it, but in which position they prevent the movement of the plunger 6 towards the opening 5 in the end part 2 of the suction device.

Still in a preferred embodiment of the invention, the means 10 can be positioned in such a position that they allow the removal of the disposable tip 3 with the movement of the plunger 6, but prevent the plunger 6 from moving in the direction of the opening 5 in the end part 2 after detachment of the disposable tip 3.

In a preferred embodiment of the method according to the invention, the barrier means is detached from the end part 2 of the suction device by positioning the means 10 in such a position that the means 9 associated with the operating means 7 come into contact with the means 10, when the plunger 6 is moved with the operating means 7 towards the opening 5 in the end part 2 of the suction device.

When the plunger 6 is further moved towards the opening in the end part 2, the means 10 come into contact with the disposable tip 3 attached to the end part 2 and when the movement of the plunger 6 continues in the direction of the opening in the end part bring about the detachment of the disposable tip 3 from the end part 2 of the suction device. After the detachment of the disposable tip 3 the means 10 are positioned in another position, in which the plunger 6 can be moved towards the opening in the end part and in which position the plunger 6 moving further comes into contact with the barrier means 12 adapted to the end part 2 and when the movement continues towards the opening 5 in the end part 2, the plunger detaches the barrier means 12 from the end part 2 of the suction device.

In a preferred embodiment of the invention the means 10 can be positioned in such a position after the detachment of the barrier means 12, that the means in association with the plunger 6 can come into contact with the means 10. The movement of the plunger 6 back into the cylindrical space 4 brings about the movement of the means 10 away from the end part 2 of the suction device towards the body 1 of the suction device in such a position in which the disposable tip 3 can be attached on the end of the end part 2 of the suction device.

In a preferred embodiment of the invention the means 10 are at that time brought in such a position, in which the contact between the means 10 and the means associated with the plunger 6 loosens when moving the plunger 6 into the cylindrical space 4.

## CLAIMS

1. A method in a suction device, such as a mechanical pipette, comprising a body (1) and an associated end part (2) with an open distal end directed away from the body (1) for removably attaching a disposable tip (3) enclosing a sample space (11) for receiving a liquid sample, the end part (2) of the suction device enclosing a cylinder space (4) containing a reciprocatingly movable means (6), a plunger, for changing the volume of the cylindrical space (4) for receiving a sample to the tip (3) and removing it therefrom, and to which end part (2) of the suction device is adapted a barrier means (12) to close an opening (5) in the end part (2),  
**characterized** in that the barrier means (12) adapted to the end part (2) of the suction device are detached by moving the plunger (6) first in the direction of the opening (5) in the end part (2) of the suction device into contact with the barrier means (12) and then by moving the plunger (6) in the direction of the said opening (5) for removing the barrier means (12) from the end part (2) of the suction device.
2. A method according to claim 1, **characterized** in that the suction device is provided with means (8,9) which limit the movement of the plunger (6) in the cylindrical space (4) and which can be brought to at least one such position in which the plunger (6) can be brought into contact with the barrier means (12) adapted to the end part (2) of the suction device for detaching the barrier means (12) from the end part (2) of the suction device.
3. A method according to claim 1, **characterized** in that the means (8,9) for limiting the movement of the plunger (6) comprise means (10) intended for detaching the removably to the end part (2) of the suction device attached disposable tip (3) which are positioned in such a position that the plunger (6) can be brought into contact with the barrier means (12) adapted to the end part (2) of the suction device.

4. A method in the suction device, such as a mechanical pipette, comprising a body (1) and an associated end part (2) with an open distal end directed away from the body (1) for removably attaching a disposable tip (3) enclosing a sample space (11) for receiving a liquid sample, the end part (2) of the suction device  
5 enclosing a cylinder space (4) containing a reciprocatingly movable means (6), a plunger, for changing the volume of the cylindrical space (4) for receiving a sample to the tip (3) and removing it therefrom, and to which end part (2) of the suction device is adapted a barrier means (12) to close an opening (5) in the end part (2), **characterized** in that the barrier means (12) adapted to the end part (2)  
10 of the suction device are detached by moving the plunger (6) first in the direction of the opening (5) in the end part (2) of the suction device in that way that a telescopic extension of the plunger (6) comes into contact with the barrier means (12) and then by moving the plunger (6) in the direction of the said opening (5) for removing the barrier means (12) from the end part (2) of the suction device.  
15
5. A method according to claim 4, **characterized** in that the suction device is provided with means (8, 9) which limit the movement of the plunger (6) in the cylindrical space (4) and which means can be brought to at least one such position in which the telescopic extension of the plunger (6) can be brought into contact  
20 with the barrier means (12) adapted to the end part (2) of the suction device for removing the barrier means (12) from the end part (2) of the suction device.
6. A method according to claim 5, **characterized** in that the means (8, 9) for limiting the movement of the plunger (6) comprise means (10) intended for  
25 removing the disposable tip (3) attached removably to the end part (2) of the suction device which means are positioned in such a position that the telescopic extension of the plunger (6) can be brought into contact with the barrier means (12) adapted to the end part (2) of the suction device.
- 30 7. A method according to one of claims 1-6, **characterized** in that the suction device is multichannel.

8. A suction device comprising a body (1) and an associated end part (2) with an open distal end directed away from the body (1) for removably attaching a disposable tip (3) enclosing a sample space (11) for receiving a liquid sample, the end part (2) of the suction device enclosing a cylinder space (4) containing a reciprocatingly movable means (6), a plunger, for changing the volume of the cylindrical space (4) for receiving a sample to the tip (3) and removing it therefrom, and means (10) for detaching the disposable tip (3) removably attached to the end part (2), **characterized** in that the suction device is provided with means (8, 9) which limit the movement of the plunger (6) in the cylindrical space (4) and which can be brought to at least one position in which the plunger (6) can be brought into contact with the barrier means (12) adapted to the end part (2) of the suction device for detaching the barrier means (12) from the end part (2) of the suction device.
- 15 9. A suction device according to claim 8, **characterized** in that the means (10) in the suction device for detaching the disposable tip (3) from the end part (2) of the suction device can be brought to a position in which they limit the movement of the plunger (6) in the cylindrical space (4).
- 20 10. A suction device according to claim 8 or 9, **characterized** in that the suction device is multichannel.



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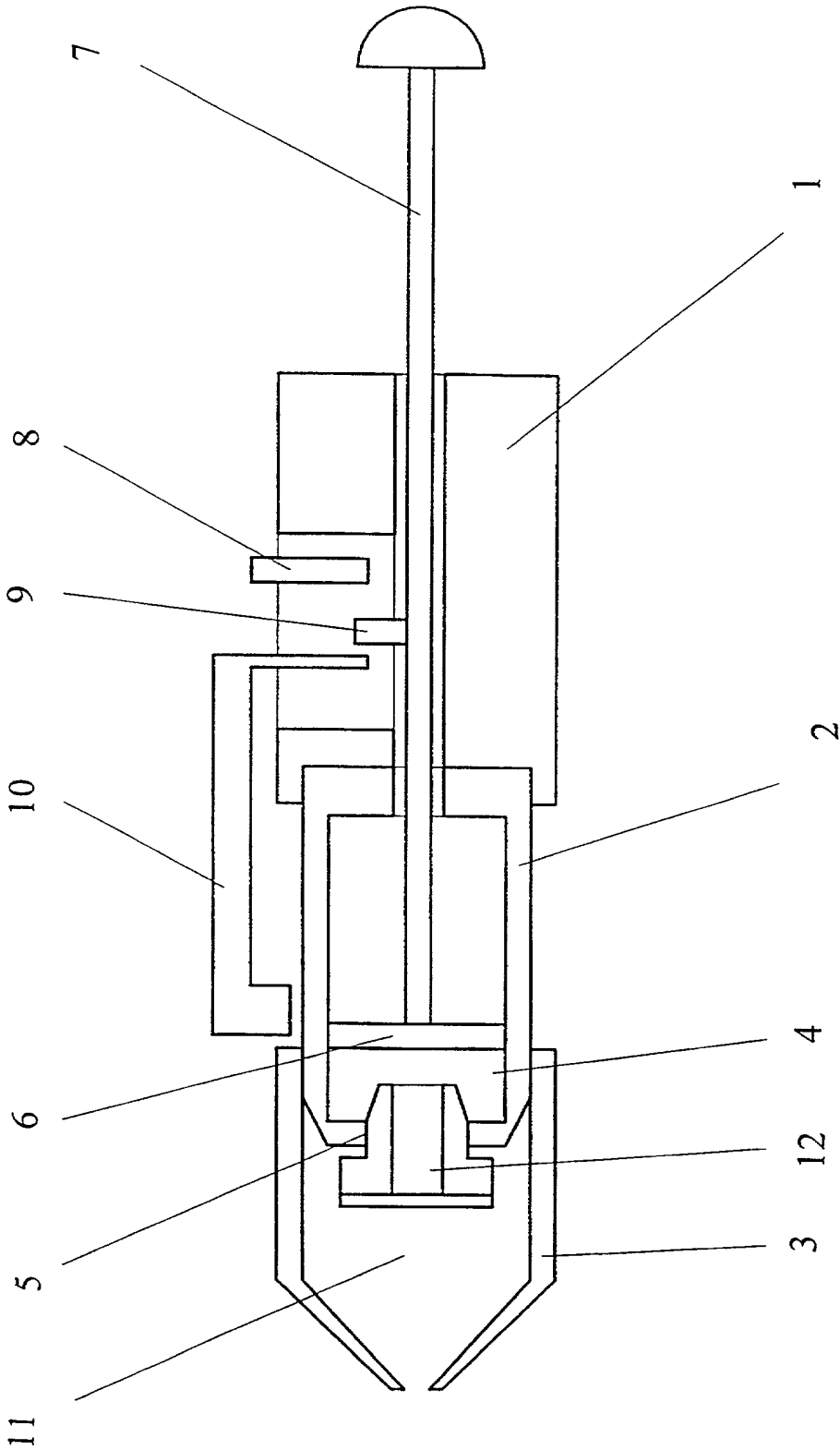


Fig. 1

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I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representative or assigns more than twelve months (six months for designs) prior to this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows.

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<u>991553</u> (Number)	<u>Finland</u> (Country)	<u>7/7/1999</u> (Month/Day/Year Filed)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
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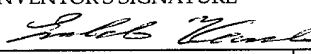
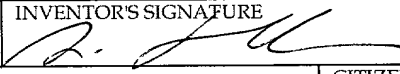
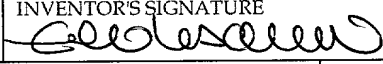
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